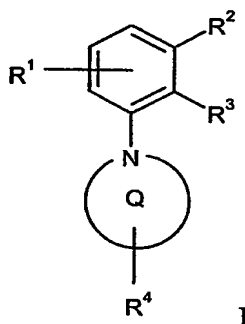


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CLAIMS

1. A process of preparing an arylamine of formula I:



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comprising heating a heterocyclyl ring moiety with an aromatic compound with a base and a solvent in the presence of a transition metal catalyst including a phosphine ligand at a temperature between about 120 and about 150°C and for a time effective to give an arylamine compound of formula I,

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wherein: R^1 is selected from H, C_{1-10} alkyl, halogen, amino, methoxy, ethoxy, or hydroxy;

15

R^2 is selected from H, C_{1-10} alkyl, C_{2-10} alkenyl, C_{2-10} alkynyl, C_{1-10} alkyl-amino, C_{3-10} cycloalkyl, C_{3-10} cycloalkyl- C_{1-6} alkyl, C_{4-8} cycloalkenyl, C_{4-8} cycloalkenyl- C_{1-6} alkyl, C_{3-10} heterocyclyl- C_{1-6} alkyl, C_{3-5} heteroaryl, C_{6-10} aryl or C_{6-10} aryl- C_{1-6} alkyl, wherein said H, C_{1-10} alkyl, C_{2-10} alkenyl, C_{2-10} alkynyl, C_{1-10} alkyl-amino, C_{3-10} cycloalkyl, C_{3-10} cycloalkyl- C_{1-6} alkyl, C_{4-8} cycloalkenyl, C_{4-8} cycloalkenyl- C_{1-6} alkyl, C_{3-10} heterocyclyl- C_{1-6} alkyl, C_{3-5} heteroaryl, C_{6-10} aryl or C_{6-10} aryl- C_{1-6} alkyl, used in defining R^2 is optionally substituted by one or more groups selected from H, C_{1-10} alkyl, halogen, amino, methoxy, ethoxy, oxo and hydroxy;

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R^3 is selected from H, C_{1-10} alkyl, C_{2-10} alkenyl, C_{2-10} alkynyl, C_{1-10} alkyl-amino, C_{3-10} cycloalkyl, C_{3-10} cycloalkyl- C_{1-6} alkyl, C_{4-8} cycloalkenyl, C_{4-8} cycloalkenyl- C_{1-6} alkyl, C_{3-10} heterocyclyl- C_{1-6} alkyl, C_{3-5} heteroaryl, C_{6-10} aryl or C_{6-10} aryl- C_{1-6} alkyl, wherein said H, C_{1-10} alkyl, C_{2-10} alkenyl, C_{2-10} alkynyl, C_{1-10} alkyl-amino, C_{3-10} cycloalkyl, C_{3-10} cycloalkyl- C_{1-6} alkyl, C_{4-8} cycloalkenyl, C_{4-8} cycloalkenyl- C_{1-6} alkyl, C_{3-10} heterocyclyl- C_{1-6} alkyl, C_{3-5} heteroaryl, C_{6-10} aryl or C_{6-10} aryl- C_{1-6} alkyl, used in defining R^3 is optionally substituted by one or more groups selected from H, C_{1-10} alkyl, halogen, amino, methoxy, ethoxy, oxo and hydroxy;

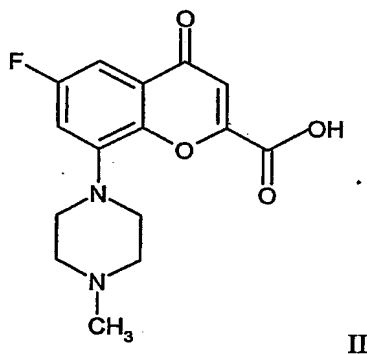
R^2 and R^3 can form a substituted or unsubstituted 5- or 10- membered aromatic or heteroaromatic ring having 0, 1, 2, or 3 nitrogen atoms, 0 or 1 oxygen atoms, and 0 or 1 sulfur atoms said aromatic or heteroaromatic rings or ring systems, when substituted, having substituents selected from C_{1-10} alkyl, oxygen, oxo, halogen, amino, carbonyl, hydroxycarbonyl, C_{1-6} alkyl-oxycarbonyl, methoxy, methoxy- C_{1-6} alkyl, ethoxy, and hydroxy.

R^4 is selected from H, C_{1-10} alkyl, halogen, amino, methoxy, ethoxy, and hydroxy;

- 20 2. A process according to claim 1, wherein R^1 is, independently, hydrogen or fluoro.
3. A process according to claim 1, wherein R^2 is methyl-carbonyl
4. A process according to claim 1, wherein R^3 is hydroxy.
5. A process according to claim 1, wherein R^4 is methyl.
6. A process according to claim 1, wherein Q is piperazinyl.
- 25 7. A process according to claim 1, wherein R^2 and R^3 form an optionally substituted 3,4-dihydro-2H-pyran ring having substituents, independently selected from H, oxo, C_{1-3} alkyl-oxycarbonyl and hydroxycarbonyl.
8. A process according to claim 1, wherein said base is cesium carbonate
9. A process according to claim 1, wherein said solvent is anisole.
- 30 10. A process according to claim 1, wherein said solvent is xylene.

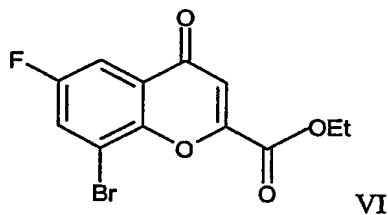
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11. A process according to claim 1, wherein said transition metal catalyst is selected from palladium or palladium acetate.
12. A process according to claim 1, wherein said transition metal catalyst is $d_2(dba)_3$.
13. A process according to claim 1, wherein said phosphine ligand is racemic 2,2'-bis(diphenylphosphino)-1,1'-binaphthyl (rac-BINAP).
14. A process according to claim 1, wherein said heating is at a temperature between about 125 and about 130°C.
15. A process of preparing a compound of formula II:



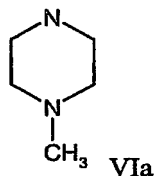
comprising:

A) heating a mixture of a compound of formula II:

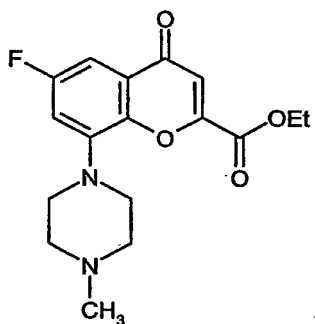


and a compound of formula VIa:

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with a base and a solvent in the presence of a metal transition catalyst including a phosphine ligand at a temperature between about 120 and about 150°C and for a time effective to give compounds of formula VIb:



VIb, and

B) hydrolysis of compound of formula VIb under either basic or acidic conditions at a temperature and for a time effective to give compounds of formula (II).

16. A process according to claim 15, wherein said base is cesium carbonate

17. A process according to claim 15, wherein said solvent is anisole.

18. A process according to claim 15, wherein said solvent is xylene.

19. A process according to claim 15, wherein said transition metal catalyst is selected from palladium or palladium acetate.

20. A process according to claim 15, wherein said transition metal catalyst is Pd₂(dba)₃.

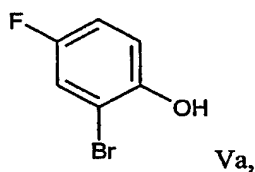
21. A process according to claim 15, wherein said phosphine ligand is racemic 2,2'-bis(diphenylphosphino)-1,1'-binaphthyl (rac-BINAP).

22. A process according to claim 15, wherein said heating is at a temperature between about about 125 and 130°C.

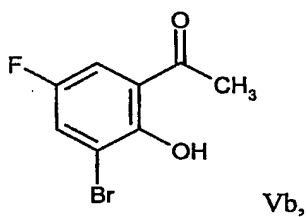
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23. A process of preparing a compound of formula II comprising:

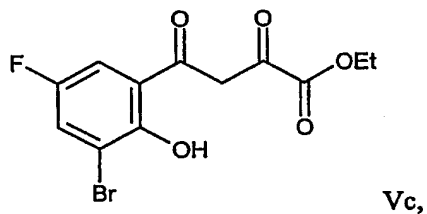
A) heating a mixture of a compound of formula Va:



and acetyl chloride in the presence of a Lewis acid catalyst at a temperature and for a time effective to give compounds of formula Vb:

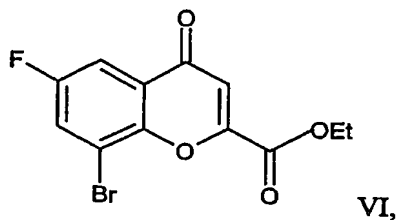


B) combining the compounds of formula Vb and diethyl oxalate to an alcohol solution at a temperature and for a time effective to give compounds of formula Vc:

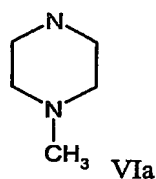


C) heating the compound of formula Vc with a mixture of acids at a temperature and for a time effective to give compounds of formula II:

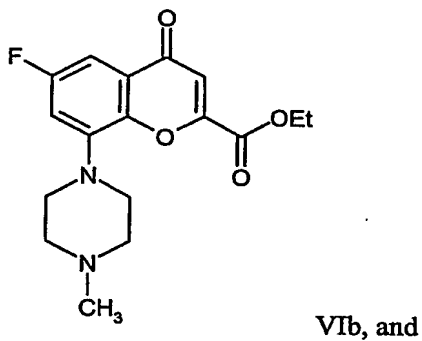
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D) heating a mixture of a compound of formula II and a compound of formula VIa:



with a base and a solvent in the presence of a metal transition catalyst including a bidentate phosphine ligand at a temperature between about 120 and 150°C and for a time effective to give compounds of formula VIb:

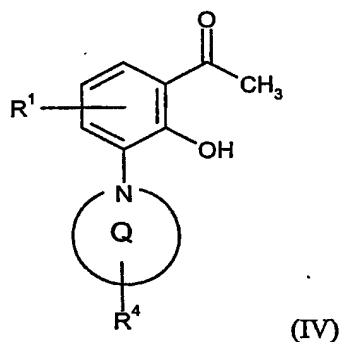


B) hydrolysis of compound of formula VIb under either basic or acidic conditions at a temperature and for a time effective to give compounds of formula (II).

24. A process according to claim 23, wherein said Lewis acid catalyst is aluminum chloride.

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25. A process according to claim 23, wherein said Lewis acid catalyst is zirconium tetrachloride.
26. A process according to claim 23, wherein said alcohol solution is sodium ethoxide in absolute ethanol.
- 5 27. A process according to claim 23, wherein said mixture of acids is a mixture of acetic acid and hydrochloric acid.
28. A process according to claim 23, wherein said base is cesium carbonate
29. A process according to claim 23, wherein said solvent is anisole.
30. A process according to claim 23, wherein said solvent is xylene.
- 10 31. A process according to claim 23, wherein said transition metal catalyst is selected from palladium or palladium acetate.
32. A process according to claim 23, wherein said transition metal catalyst is $\text{Pd}_2(\text{dba})_3$.
33. A process according to claim 23, wherein said phosphine ligand is racemic 2,2'-bis(diphenylphosphino)-1,1'-binaphthyl (rac-BINAP).
- 15 34. A process according to claim 23, wherein said heating is at a temperature between about 125 and 130°C.
35. A compound of the formula (IV):



wherein

- 20 R^1 is selected from H, $\text{C}_1\text{-C}_6$ alkyl, halogen, hydroxy, methoxy or cyano,
 Q is selected from piperidinyl, piperazinyl, morpholinyl, pyrrolidinyl, azetidinyll or isoxazolidinyl, and R^4 is selected from H, $\text{C}_1\text{-C}_6$ alkyl, $\text{C}_3\text{-C}_6$ cycloalkyl, hydroxy, methoxy, aryl or heterocyclyl.

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36. A compound according to claim 35, wherein R¹ is, independently, hydrogen or fluoro.
37. A compound according to claim 35, wherein Q is piperazinyl.
- 5 38. A compound according to claim 35, wherein R⁴ is, independently, H or C₁-C₄ alkyl.
39. A compound according to claim 35, wherein R⁴ is methyl.